WASTE ANALYSIS 101

WHY DO A WASTE ANALYSIS

A waste analysis is a measurement tool and a management tool, but it is also a valuable learning experience. The obvious reason to do a waste analysis is to see what's in your trash. Besides noting what's there, examine why it's there and whether it should be somewhere else. Maybe it could be reused or recycled. Maybe we bought more than we needed in the first place. Could it have value to someone else? The bottom line: what can we do to keep these materials out of our dumpster and thus save on our disposal costs while conserving valuable natural resources and landfill space?

A Waste Analysis at the beginning of a recycling program helps set a baseline that can be used later to measure the effectiveness of the program and pinpoint weaknesses so that appropriate educational or operational efforts can be developed. The results of a Waste Analysis can often persuade school officials to consider the possibility of implementing a recycling program in the school.

Finally, wading through a day's or week's worth of trash and extrapolating the results to project a year's worth or even a lifetime's worth, or a city's worth of waste can be an unparalleled eye-opener for an interested youth.

PLANNING THE ANALYSIS

Discuss the mission of the analysis
What is the purpose? What are we looking for? Bring up the "Gross Factor" so it won't be brand new on Waste Analysis Day. Prepare for squeamishness.

Select dates
Do the analysis before the school starts recycling, or as soon as possible afterwards to provide a baseline. Then designate a date as close to the end of the school year as practical to measure progress. Add a mid-point dive if desired.

Select an appropriate site
The site should be paved, clean, out of the traffic flow, not needed for several hours, and able to be hosed off after the analysis.

Make appropriate contacts
Contact the Building Services Department in advance of the Waste Analysis to arrange for the dumpster to be dumped at a specific time and date. Schedule it so that the dumpster will have only one day's worth of waste in it. Contact the Custodial Services Department to arrange to have the bathroom waste collected in different or tagged bags so they can be identified easily and weighed without opening.

Gather the necessary supplies

- A large scale that can accommodate big bags of trash
- A dozen or so identical bins to sort the material streams, including recyclables
- Signs for the bins (plus a few blanks) and clear packing tape or duct tape
- Sturdy protective "rubber" gloves (not fabric) and boots
- Latex or vinyl liner gloves
- Clipboard, pen and material stream recording forms (recording forms attached)
- Large trash bags
- Heavy brooms, shovels, and a water hose
- Traffic cones or other means to mark off the analysis site
- Cardboard knife, scissors
- Anti-bacterial hand-cleaner

Design and Diagram the Analysis

Plan the operation. In a nutshell: Open bags of waste, sort materials into specified streams. Weigh all sorted materials, record weights and other pertinent information. Return non-recyclable materials to the dumpster. Clean up the area.

Make a preliminary list of the streams into which the materials will be sorted and sorting protocols. See attached list for suggested sorting streams and protocols. The actual streams used depend on what the school generates.

Decide where you will orient the operation once the dumpster is emptied on the ground. Where will you stage your bins, and in what order? Where will you place collection points for trash categories that aren't placed in bins (non-recyclable)? Where will you place the scales? Keep in mind that you want to keep the distances between the waste and the container and the scales as close as possible while allowing enough room for the participants to move around.

Assign roles: Who will pick through the materials? Who will record the weights, take notes and maintain records? Who will reload the dumpster?

Cross your fingers and do an anti-rain dance.
The Waste Analysis is a no-go in wet weather: the weights will be corrupted.

CONDUCTING THE ANALYSIS

- Eyeball the container before dumping to "guesstimate" how full it is and record.
- Weigh one of the sorting bins. This amount will be subtracted each time you weigh a container and record the amount in order to keep the weight totals accurate. If different types of containers are used, consider writing the weight on the outside of each container.
- Open bags and begin sorting. Some may prefer to take a bag and sort all materials from that bag. Others may wish to sort for only one material at a time. Try to keep bags intact so they can be reused for the trash. Place items from the identified categories in their designated bins or at collection points. Put food items and garbage back into bags and move them to the collection point for weighing.

- As the bins fill with recyclables, weigh them and record the weights in the proper category on the material form, remembering to subtract the container weight each time. If the bin contains a material that you are planning to recycle afterward, transfer it to a clean bag or container and set it aside. Keep track of the amounts you will recycle. Return the empty bin to the sorting area.
- Weigh and record bags of cafeteria waste or other garbage, record the weights in the proper category and return the items to the dumpster. It is not necessary to subtract any container weight because the reused bags came out of the dumpster in the first place.
- Don't open identifiable bags of bathroom waste. This is usually paper waste. Just weigh it, record it as trash and return it to the dumpster.
- After all bags have been sorted, sweep/shovel up all material remaining on the ground, bag it, weigh and record it and return it to the dumpster.
- Eyeball the container after refilling it and "guesstimate" how full it is and record. Restore equipment and the collection site to their previous condition.
- Take recyclables you have sorted to a Recycling Center.

Stay flexible. Get a feel for what types of non-recyclables are occurring and recurring before depositing them in the trash area. You may want to create new sort categories if you find certain materials recurring. Examples: unopened cutlery packets, half rolls of toilet paper, unused items, unopened food packages, etc. Look for and note things that shouldn't necessarily be in there, such as unused or partially used products.

Analysis Health and Safety Tips:

- Wear old long-sleeved shirts and long pants, or disposable suits.
- No food or drink near the sorting area.
- Avoid touching face or skin while gloved.
- Use anti-bacterial soap after removing gloves until you are able to thoroughly wash up.
- Be alert for bees, especially if the weather is warm.

LEARNING FROM THE ANALYSIS

Prepare the data

- Add up all of the waste streams to calculate the total weight of the dumpster contents. To calculate the amount of waste generated during the school year, multiply this by the number of school days, but don't forget that waste is still generated when school is not in session!
- Divide the total weight of the dumpster contents by the total number of students, faculty and staff to calculate the average weight per person produced during a school day.
- Calculate the percentage of the total dumpster weight that each sorting stream represented.
- Calculate the total weight of the recyclables and the percentage of the total weight they represented.
- How did the volume of the dumpster compare visually after recyclables were removed?

Analyze the results. Ask questions.
(Keep in mind that the results represent one day's worth of materials. Use the numbers to project weekly, monthly and annual totals as you do your evaluation.)

If your school already has a recycling program or is about to start one, look to see how much of the materials that have been identified for recycling are in the dumpster. This is how much "progress" must be made, so this is where the bulk of efforts should be focused. What needs to be done to keep this material out of the dumpster? If your school does not yet have a recycling program, take a look at the traditional school recyclables: sorted office paper, cardboard, newspaper, magazines, aluminum cans, plastic bottles and steel cans.

Are there other opportunities? For example, do your results indicate there is a significant amount of another recyclable material? Would your school be willing to undertake or approve additional recycling activities? The most obvious possibility is to organize a student effort to recycle and redeem aluminum cans, using the recovery profits to underwrite a student activity. Not all materials hold the attraction of fiscal recovery. Nonetheless, significant amounts of other materials should also merit closer examination. Are there any other materials that could be recycled within your school's capability?

Don't just concentrate on recycling. Remember the Three R's are a hierarchy: Reduce, *then* Reuse, *then* Recycle. As you look at what's in your dumpster, remember to ask what shouldn't be there. Many businesses have found waste stream analysis to be a valuable management tool, because it has identified wasteful operating practices. For example, are there unused or partially used items or products in the waste stream? Is there a way to avoid throwing those items away? Can they be diverted through reuse, or can steps be taken to see that they are fully used?

Does your data analysis suggest any other reduction or reuse practices that could be implemented in your school? What steps (logistical adjustments, education, etc.) would be needed to implement these ideas?

If your school has or implements a recycling program, it is helpful, if possible, to schedule another analysis near the end of the school year and use the results to measure progress made during the year. Are you still finding the paper and cardboard in the dumpster? If so, the procedures need to be examined to see how they can be improved for the following year. If not, then you get an A+!

SUGGESTED WASTE SORTING STREAMS AND PROTOCOLS

Material	Protocol	Disposition
Sorted Office Paper*	Bins	Recycle
Wet Paper*	Bins	Dumpster
Newspaper	Bins	Recycle
Magazines	Bins	Recycle
Cardboard*	Break down, stack	Recycle
Aluminum Cans	Bins	Recycle
Mixed Plastic Bottles	Bins	Recycle
Glass	Bins	Recycle
Steel Cans	Bins	Recycle
Styrofoam	Bins	Dumpster
Tyvek Envelopes	Bins	Recycle/Dumpster
Cafeteria Waste*	Bags	Dumpster
Uneaten Whole Food*	Bin or box	Dumpster
Trash*	Bags	Dumpster
Construction/Remodeling Debris*	Bag or	Individual Dumpster
Miscellaneous*	Bag or	Individual Dumpster

*Waste Stream Constituents

Sorted Office Paper: Generally all types of non-coated paper, such as white paper, colored paper, notebook paper, file folders, manila envelopes, junk mail, etc. No plastic-coated or foil-coated paper.

Wet Paper: This is sorted office paper that has gotten wet in the dumpster. It is included because it could/should have been recycled.

Cardboard: Cardboard boxes and usually includes boxboard, such as cereal boxes. They should be uncoated. Boxes should be broken down and stacked.

Cafeteria Waste: Includes preparatory food waste such as peels, uneaten food from student meals; and food packaging waste such as plastic bags and plastic wrap.

Uneaten Whole Food: Packaged/whole foods that were still suitable for consumption before they were discarded, including unopened bags of chips or cookies, boxes of cereal, whole apples,

etc. These could either be diverted to a charity food kitchen or not thrown away in the first place (education necessary here).

Trash: Non-food garbage, bags of bathroom waste, broken items that can't be repaired and typical non-recyclable trash items.

Construction/Remodeling Debris: Small items from remodeling or repair activities, such as plastic/non-metal piping, electrical cords or supplies, and etc. Large items or large quantities typically are prohibited by the vendor. Paints, chemicals or cleaning products and fluorescent light tubes are prohibited.

Miscellaneous: These are streams that you add along the way, depending on what trends you encounter. Typically this will be either a large item or a recurring item that you want to keep a weight on and give further thought to later. For example, items that appear to be intact and that could have been diverted elsewhere such as desks or other furniture items, books, half rolls of toilet paper, and unused items such as cutlery packets, etc.

Waste Analysis Preparation List

School contact:

- Best if an interested teacher is the contact, then
- Secure permission from the principal
- Notify custodians
    - It would be helpful if custodians could arrange for clear bathroom waste bags or a different color for the day prior to the analysis

Waste Hauler Contact:

- Contact waste hauler and inform them of the project
- Determine trash pick-up schedule
- Tell the hauler not to empty the specified dumpster for the time frame established for the project
- Arrange for the trash from one day to be staged on a trailer or elsewhere
- May need to schedule special dumpster pick-up depending on trash remaining after the analysis.

Materials Needed:

- A large scale that can accommodate large bags of trash
- A dozen or so identical bins to sort the material streams, including recyclables
- Signs for each material category for the bins (plus a few blanks) and clear packing tape or duct tape
- Sturdy protective "rubber" gloves (not fabric) and boots (no open-toe shoes or sandals)
- Latex or vinyl liner gloves
- Clipboard, pen and material stream recording forms
- Large trash bags for remaining trash and transporting recyclable materials
- Heavy brooms and shovels, and a water hose

- Traffic cones or other means to mark off the waste analysis site
- Cardboard knife, scissors
- Anti-bacterial hand-cleaner

Determine an Outlet for the Recyclables

- Contact local recyclers to determine which materials they will accept
- Find out how the recyclers want the materials prepared (lids off bottles, cardboard flattened, etc.)

Use on Site

Name of School or Organization Waste Analysis
Date

Dumpster Location:_____ Dumpster Size:_____

MATERIAL TYPE	WEIGHT (lbs)	TOTAL WEIGHT (lbs)
Glass		
Styrofoam		
Sorted Office Paper		
Cardboard		
Aluminum Cans		
Mixed Plastic		
Steel Cans		
Magazines		
Newspaper		
Metal		
Trash		
Food Waste		
Other:		
Other:		
Other:		
Other:		
Other		

Empty Recycling Container Weight_____
How Full is the Dumpster (estimate)_____
How Full is the Dumpster After Sorting_____

Use for final calculations

Name of School or Organization Waste Analysis
Date

Dumpster Location_____ Dumpster Size_____

MATERIAL TYPE	TOTAL WEIGHT (lbs)	% BY WEIGHT
Glass		
Styrofoam		
Sorted Office Paper		
Cardboard		
Aluminum Cans		
Mixed Plastic		
Steel Cans		
Magazines		
Newspaper		
Metal		
Trash		
Food Waste		
Other:		
TOTAL WEIGHT		
Weight Municipal Solid Waste (MSW)		
% MSW		***
Weight Recyclables		***
% Recyclables		***

Example Sheet

Name of School or Organization Waste Analysis
Date

Dumpster Location_____ Dumpster Size_____

MATERIAL TYPE	TOTAL WEIGHT (lbs)	% BY WEIGHT
Glass	7.5	0.9%
Styrofoam	4.0	0.5%
Sorted Office Paper	118.5	14.9%
Cardboard	38.5	4.8%
Aluminum Cans	7.5	0.9%
Mixed Plastic	11.0	1.4%
Steel Cans	1.5	0.2%
Magazines	15.0	1.9%
Newspaper	52.0	6.5%
Metal	Negligible	Negligible
Trash	269.5	33.8%
Wire	4.0	0.4%
Books	268.0	33.6
TOTAL WEIGHT	797.0	100.0%
Weight Municipal Solid Waste (MSW)	269.5	
% MSW	33.8	***
Weight Recyclables	527.5	***
% Recyclables	66.2%	***